

**Tuesdays 4:30pm – 7:30pm @ Biology/Natural Resources Rm. 113**

**Instructor:** Rick A. Cruz Ph.D.

**Office:** Education 492 (office hours by appointment)

**email:** [rick.cruz@usu.edu](mailto:rick.cruz@usu.edu)

**Required Text:**

Shadish, William R., Cook, Thomas D., & Campbell, Donald T. (2002). *Experimental and Quasi-Experimental Designs for Generalized Causal Inferences*. Belmont, CA: Wadsworth Cengage Learning.

*Supplemental Reading: Please note that any non-textbook readings on syllabus will be posted to Canvas*

**Expectations:** This syllabus is a contract between you (the student) and me (the professor). We are both expected to adhere to what is written in this document. In order to achieve the grade you want please be aware of what is expected of you. It is possible there might be changes to the syllabus and/or course schedule to create an adaptive and optimal learning experience, but I will give you advance notice of those changes.

Learning opportunities will occur via lectures, class activities and discussion, reading of the assigned texts, and the development of a research proposal portfolio. This class will be conducted in a mixed didactic/seminar format. Therefore, it will be less formal and you will be expected to assist in helping the class move forward. All students will be expected to have read all assigned material prior to class, have prepared questions and/or other topics to discuss prior to class, participate in class discussions and activities, and have all assignments completed on time. Additionally, students will be expected to work collaboratively in pairs/groups both in and outside of class. It is also expected that you will interact with your classmates and your instructor in a respectful and professional manner. That includes using technology (your laptop, tablet, smartphone) in a respectful and professional manner.

**Course Description and Objectives:** The goal of this class is to provide a graduate level introduction to methods and design in psychological and educational research. These goals map on to key learning objectives:

<b>Key Learning Objective</b>	<b>IDEA Objective</b>	<b>Mechanisms by which course will help you achieve objective</b>
(1) Demonstrate knowledge of research design and key methodological issues (e.g., validity, randomization, causal inference)	#1: Gaining factual knowledge (terminology, classifications, methods, trends)	-readings --in-class discussions -class presentations -research method portfolio

(2) Gain familiarity with principles of research design, causal inference, research writing and scientific epistemology.	#2: Learning fundamental principles, generalizations, or theories	--readings --in-class discussions -class presentations -research method portfolio
(3) Develop scientific/critical thinking skills and perspective; develop competencies in synthesizing research literature and developing a research proposal.	#4: Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course	--readings --in-class discussions -class presentations -research method portfolio

**Learning Outcomes**

1. Critically read published empirical studies to:
  - a. Identify the authors’ research questions or objectives.
  - b. Describe the study’s design and methodology
  - c. Summarize the authors’ conclusions.
  - c. Identify the major threats to internal, external and construct validity and discuss the appropriateness of the authors’ conclusions in light of those threats.
  - d. Suggest improvements in the design of critiqued studies to remedy the perceived threats to internal or external validity.
  
2. Conduct a systematic review of the literature for the purposes of (a) identifying research questions related to a student-selected topic, (b) describing the strengths and weaknesses in previous studies on the topic, and (c) delineating methodological issues to be resolved in designing a study in the area of the student’s topic. These skills will include the ability to:
  - a. Examine and critique previous studies.
  - b. Write an introduction for the review.
  - c. Write objectives for the review.
  - d. Obtain articles/studies to be reviewed.
  - e. Develop a framework and instrument for coding the studies.
  - f. Systematically read studies and synthesize information to inform problem statement.
  - g. Interpret and report results of review.
  - h. Write a problem statement based on your review, to inform your research proposal.
  
3. Construct a research proposal
  - a. Describe the elements of a research proposal.
  - b. Use APA and USU Publication Guide for Graduate Students when writing a literature review.
  - c. Develop specific aims and hypothesis for your research proposal
  - d. Define and assess independent as well as dependent variables.
  - e. Demonstrate understanding of at least one research design/methodology as demonstrated from by your research proposal’s method section
  - f. Demonstrate understanding of the relationships among hypotheses, measures, and analysis procedures in a research proposal.

4. Sampling and random assignment: Define target and accessible populations and explain the importance of both random sampling and random assignment for group experimental designs.
5. Understand the issues related to collecting research data using tests, questionnaires, interviews, observation, and content analyses.
6. Understand test validity and reliability and the importance of those concepts when conducting research.
- 7 Describe the methods and utility of:
  - a. Randomized experimental studies
  - b. Quasi-experimental studies
  - c. Time series designs
  - d. Regression discontinuity designs
  - e. Single case designs
  - f. Qualitative and mixed-methods research
8. Understand the differences among nominal, ordinal, interval, and ratio data and understand that these differences influence the selection of appropriate statistical procedures.
9. Understand the differences between descriptive and inferential statistics.
10. Understand the difference between statistical and practical significance including:
  - a. The meaning of statistical significance
  - b. Measures of effect size
11. Understand the ethical, legal, and practical issues in educational/psychological research

## Learning Activities

### **Participation (attendance, reading questions and answers, and in-class participation):**

Participation probably does not need to be required in graduate school. You all are (or should be) interested in these topics. Nevertheless, to be fair and predictable, objective guidelines will be set so that you know how and why you receive the points that you do. It is possible to earn 60 points for participation for this course. You can earn **4 points** for each class period:

#### **Attendance**

Point 1: Attending one class period (*Missing class due to a documented emergency/significant life event will not result in losing points*)

#### **Reading**

Point 2: You will receive one point each week for submitting **two questions** on the readings, and one point for responding to (at least) one other question submitted by your classmates. The questions should be posted to Canvas discussion board and they are **due by 5pm on Monday each week**. These questions should facilitate discussion for the class.

Point 3: Responding to at least one question posed on Canvas. (I will give extra points as I see fit for those students going above and beyond in their responses- in terms of quality and frequency of responding). Your responses to your classmates' questions are **due by 2pm on Tuesday each week**. These responses should promote additional in-class discussion.

### **In-class participation**

Point 4: Contributing meaningfully to the class discussion and activities. If you are shy or having trouble speaking in class, please talk to me individually. **If you don't say anything or are not engaging in paired/group collaborative feedback process, you will not receive the in-class participation point.**

### **In Class Presentations**

Presentations represent an important part of communicating research findings and ideas. These presentation assignments are designed to give you practice with presenting and constructive feedback to help you develop your presentation skills.

1. **Article presentation:** We will “crowdsource” articles from those that students are using for their annotated bibliography, and choose the most popular ones. In small groups of 3-4, students will review 2-3 articles (on the same or relative similar topic) reporting the results of experimental, quasi-experimental, single-subject/case study, qualitative, or meta-analytic studies. Groups will collaboratively create a presentation summarizing the studies and present to the class on a chosen date, and answer questions about the studies. Students will be evaluated by their peers (and their instructor) on a rubric provided by the instructor.

2. **Research project proposal presentation:** Students will present their research project proposal in class towards the end of the semester, and answer questions posed by classmates. Students will be evaluated by their peers (and their instructor) on a rubric provided by the instructor.

### **Research Methods Portfolio**

The main aim of this course is to provide students with an opportunity to develop their understanding of the research process and their critical thinking skills. You will have the opportunity to generate a research portfolio that tracks the development of your research project proposal. The portfolio will break your research project proposal down into smaller, more manageable tasks, including your research question, literature review plan, coding sheet, literature review and proposal introduction, and your methods and data analysis section. You will have a chance to receive feedback from your classmates before submitting assignments, and you will receive peer evaluations on your literature review and proposal statement, and your method section. The instructor will evaluate the first draft of your full proposal (due Week 12), and you will have a chance to revise your submission based on feedback (due Finals week). You will also reflect on your learning over the course of the semester in the form of a process-oriented reflection essay. All of these materials (plus your final article and proposal presentations) should be uploaded to your personalized Box research portfolio that I will “share” with you.

The following elements will make up your research methods portfolio:

**1. Research Topic and Question:** For this assignment, students are required to submit their initial proposed research topic and question. This should be submitted as a **one page word-document** that includes (a) the preliminary title of their research proposal, (b) 1-2 research questions, (c) a statement about the *significance* of the research, describing why the topic is important and relevant, and (d) references for 2 topic-related, peer-reviewed research articles. Assignment should be uploaded to Box portfolio on or before due-date.

**2. Literature Review Plan/Methods Section:** The literature review plan is tied to your problem statement. Each student will write a 1 page introduction to their literature review that details the method for their literature search. This document will include at least 2-3 literature review objectives, the sources to be examined (e.g., PsycInfo, ERIC, PubMed, google scholar, etc.), specific keywords to be used, and inclusion/exclusion criteria for studies reviewed. The studies to be reviewed should all be from peer-reviewed academic journals. Assignment should be uploaded to Box portfolio on or before due-date.

**3. Annotated Bibliography (2 articles):** An annotated bibliography provides one way to systematically summarize studies that you are including in your literature review. You should complete an annotated bibliography for at least 2 articles that you are including in your literature review. Each entry should begin with the APA formatted reference for the article. The entries for each article should be 1-1.5 paragraphs long, and should summarize the problem being addressed in the study, the purpose or focus of the study, the method and design of the study, key results of the study, the significance/implications of the study, and a critique of the methods/design that identifies any notable threats to internal, external and/or construct validity. Assignment should be uploaded to Box portfolio by due-date.

**4. Coding sheet and Table:** Students will develop a coding scheme to organize, analyze and synthesize information on relevant characteristics and variables in the articles for their literature review. These characteristics should include at least three major categories, including (a) sample characteristics, (b) research design characteristics, and (c) research outcomes/findings. This should be submitted as a 1-2 page word document. Students will apply their coding scheme to the articles collected during their systematic literature search, and present the data from those articles in a coding table (landscape format). The coding table should be submitted as a word document or excel document. Assignment should be uploaded to Box portfolio by due-date.

**5. Research project proposal- literature review and purpose statement:** The literature review is a written document that introduces the students' proposed research topics, and provides a narrative summary and synthesis of the relevant literature from the student's systematic literature review. This literature review will then lead directly into the purpose statement for the proposed study. A well-developed literature review and proposal introduction does not simply regurgitate the method and findings from single studies in sequence, but is well-organized and offers a synthesis of the state of the literature/science in that given topic area. The literature review and purpose statement should be between 3-4 pages in length (double spaced, APA format, 1 in. margins, Times New Roman font). Final assignment should be uploaded to Canvas (and Box portfolio) by due-date.

**6. Research project proposal- method section:** The method section for your research project proposal is a written document that covers the design and methodology for your proposed research study. The method section should cover research design, including sampling and participant characteristics; study procedures, including description of your intervention/manipulation or qualitative design, measures used (questionnaires, performance measure, etc.), and should also cover your proposed analytic procedure. Since some of you may not have had a graduate level statistics class at this point, you will work with your classmates and your instructor to develop the analytic section. This document should be between 2-3 pages in length (double spaced, APA format, 1 in. margins, Times New Roman font). Please also include figures to illustrate your study design, or proposed analytic procedure (e.g., path analysis). Final assignment should be uploaded to Canvas (and Box portfolio) by due-date.

**7. Full research project proposal paper:** This document combines the previous two documents (your lit review/introduction, purpose statement, and methods sections) into your full research project proposal. Your final document should be a **maximum** of 7 pages length (double spaced, APA format, 1 in. margins, Times New Roman font). Your full proposal should also include a title page, references, and any appendices, which will not be counted in the 7 page limit. Final assignment should be uploaded to Canvas (and Box portfolio) by due-date. **Revise and resubmit:** After I have evaluated your assignment submission and given you feedback, you will have 3 weeks to revise and resubmit to improve your grade.

**8. Peer reviews:** An important part of psychological and educational research is the peer review process. You will get an opportunity to provide peer reviews for two assignments, the literature review and purpose statement, and the method section. For each assignment, you will provide constructive critical feedback to two classmates, which will result in four total peer review opportunities. You will include your peer review documents in your final portfolio. Peer reviews should be uploaded to Box portfolio at the time of final portfolio submission.

**9. Example method papers collection:** By the end of the semester, you should have developed a collection of **at least 3 papers** that illustrate *different* methods/designs (e.g., one experimental study, one quasi-experimental study, and one single-case design). These papers do not necessarily have to be method papers (i.e., the major focus demonstrates a statistical innovation) but can be substantive papers in your area (or in a closely related area) that utilize and describe these methods. This collection is designed to serve as a reference for your future research. Method papers should be uploaded to Box portfolio at the time of final portfolio submission.

**10. Reflection assignment:** The reflection assignment consists of a process-oriented essay describing what you learned during the semester, and specific goals that you have for developing your understanding of research methodology. Summarize two to three of the most important things that you will take with you from the course, and two to three goals for your future learning and study. The reflection assignment should be between 2-3 pages (double spaced, APA format, 1 in. margins, Times New Roman font). The reflection assignment should be uploaded to Box with your final portfolio at the end of the semester.

**Formatting:** All documents (including peer reviews) should be uploaded as word documents (.doc or .docx extensions) to Box and Canvas with the following document formatting: APA

style, 1-inch margins, 12pt Times New Roman font. The one exception is the coding table excel spreadsheet does not have specific formatting requirements.

**Exams**

There will be a midterm and final exam that will be administered in class. The final exam is cumulative. Questions will be a mixture of multiple-choice, fill-in-the-blank, and short-answer. Makeup exams will only be offered in cases of documented emergencies.

**Grades**

**Grade summary:**

Your grade will be based off four areas: participation in class (attendance, discussion, and reading), presentations, your research portfolio, and exams.

Grading Areas	Points Possible
Participation (4 points per class period * 15 class periods)	60
Presentations	
1. Article presentation	10
2. Research proposal presentation	30
Research Methods Portfolio (final product)	
1. Research Topic and Question(s)	10
2. Literature Review Plan	10
3. Annotated Bibliographies (2 * 5 points apiece)	10
4. Coding sheet and Table	10
5. Literature Review and proposal introduction	50
6. Research project proposal- method section	50
<b>7. Final research project proposal paper</b>	<b>100</b>
8. Peer reviews (10 pts * 4)	40
9. Example method papers collection	10
10. Reflection assignment	10
Exams	
1. Midterm	50
2. Final	50
<b>Total</b>	<b>500</b>

Scores will not be curved and the scores that you earn will result in your final grade. Your final grade is determined by summing your scores and dividing by the total points possible. All grades will be rounded to the nearest whole number. The following grading scale will be used in this class:

<b>Grade</b>	<b>Percent Range</b>	<b>Grade</b>	<b>Percent Range</b>
A	93-100%	C+	77-79%
A-	90-92%	C	73-76%
B+	87-89%	C-	70-72%
B	83-86%	D+	67-69%
B-	80-82%	D	60-66%
		F	0-59%

**Late assignments:** All assignments are due prior to the beginning of the class periods on the dates listed below (either submitted to Box portfolio, or uploaded to Canvas). I will deduct half of the points for assignments turned in after the deadline, and I will only accept assignments (for a grade) within 24 hours after the assignment was due. This policy applies except in the case of a properly-documented emergency. If you provide documentation of an emergency that precluded you turning in the assignment in on time and I approve you turning in your assignment late, you must contact me to make the necessary arrangements to submit at a later day/time.

**USU Incomplete Policy** (Executive Memorandum 79-15): A student who has been unable to complete the work of course assignments, examinations, or reports due to extenuating circumstances such as illness, death in the family, etc. - but not due to poor performance of his/her work - and who has completed most of the coursework, may petition the instructor of the course for time beyond the end of the quarter to finish the work. If the instructor agrees, the instructor will place two grades on the final grade list for the student, an "I" and a letter grade for the course computed as if the missing work were zero. The student is then required to complete the work in the manner and by the time agreed upon with the instructor, but, in any case, within 12 months of the end of the quarter in which the "I" was given. When the grade change is submitted by the instructor within the prescribed time, both the "I" and the grade submitted with the "I" will be removed from the student's record, the new grade placed on the record, and the GPA adjusted accordingly. If no change of grade is submitted by the instructor within the prescribed period, the "I" will be removed and the grade submitted with the "I" will remain as the permanent grade for the course. Research and thesis courses taken for graduate work are exempted from this policy

**Academic Integrity:** In accord with Article VI of the Student Code of Conduct for Utah State University, academic dishonesty, including cheating, falsification, and plagiarism, the use of second-hand materials retrieved via internet or other sources, or other dishonest practices, may result in failing grade for the course and other procedural responses. Please read the full policy at: <http://www.usu.edu/studentservices/studentcode/article6.cfm>

### **Disability Resource Center Statement**

Students with Americans with Disabilities Act (ADA)-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435) 797-2444. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print, digital, or audio) are available with advance notice.

### **Inclusion Statement**

No student is permitted to create a threatening, intimidating, or harassing environment in this course. Classroom civility is a part of the Student Code, and infractions will be pursued through the Student Conduct Coordinator. This course will be conducted in a safe and tolerant environment, and any person who detracts from that environment will be instructed to leave without the ability to make up coursework.

**SCC= Shadish, Cook and Campbell book.** Assignments due in a given week are underlined. *Assignments that we will work on in class are italicized.*

Module	Topic	Assignment	Presentations
1) Aug. 30	Introduction to Research Methods and Design	<b>In class:</b> Instructor and student introductions; review syllabus; Intro discussion points.	
2) Sep. 6	Research and ethics; the research process; question and hypothesis development	<b>Due:</b> Creswell Ch. 4 (77-103), Ch. 7 (139-152); SCC Ch. 9 (279-290) <b>In class:</b> Discussion 1; <i>Draft and workshop research topic/questions.</i>	
3) Sep. 13	Systematic review and meta-analysis: A focus on the literature review	<b>Due:</b> Mertens Ch 3 (87-125); research topic/question draft to workshop <b>In class:</b> Discussion 2; <i>workshop research topic/questions</i>	
4) Sep. 20	Internal, external, and construct validity; Measurement considerations (psychometrics)	<b>Due:</b> SCC Ch. 2 (33-63) and 3 (64-102). <u>Research topic/ questions</u> <b>In class:</b> Psychology librarian Dory Cochran; Discussion 3; <i>Draft literature search plan</i>	
5) Sep. 27	Experimental Designs	<b>Due:</b> SCC Ch. 8 (246-277) and 9 (294-311); <u>Literature Search Plan</u> ; <b>In class:</b> Discussion 4; <i>Draft annotated bibliography</i>	
6) Oct. 4	Quasi-experimental designs	<b>Due:</b> SCC Ch. 4 (103-134) & 5 (135-160); <u>Annotated bibliography (at least 2 articles)</u> <b>In class:</b> Discussion 5; <i>Develop coding scheme for literature review</i>	
7) Oct. 11	Time series designs; Regression discontinuity designs	<b>Due:</b> SCC Ch. 6 (171-206) and 7 (207-242); <u>Coding scheme and coding sheet</u> <b>In class:</b> Discussion 6 & Discussion 7;	
8) Oct 18		<b>Due:</b> Creswell Ch. 5 (107-121) and 6 (123-137) <b>In class: Midterm</b>	
9) Oct. 25	Single Case designs	<b>Due:</b> Draft of lit review and introduction to workshop (Choose two of the following readings)- Horner et al., 2005; Plavnic & Ferreri, 2013 Smith, 2012; Fallon et al., 2015	Group 1

		<b>In class:</b> Discussion 8; <i>workshop lit review and proposal introduction</i>	
10) Nov. 1	Qualitative and mixed methods research	<b>Due:</b> Creswell Ch. 9 and 10; <u>Literature review and proposal introduction.</u> <b>In class:</b> Discussion 9	Group 2
11) Nov. 8	Sampling;	<b>Due:</b> Mertens Ch. 11 (319-360), initial proposal method section to workshop; <u>peer reviews of literature review and proposal introduction</u> <b>In class:</b> Discussion 10; <i>Workshop your proposal's method section</i>	Group 3
12) Nov. 15	Summarizing and Interpreting data; effect sizes	<b>Due:</b> Creswell Ch. 8 (155-182); McBride Ch 7 (142-164); <u>Proposal method section (full proposal)</u> <b>In class:</b> Discussion 11	
13) Nov. 22	Research Presentations	<b>Instructor comments/evaluation returned for full proposals</b> <b>In class:</b> Discussion 12	6 people
14) Nov. 29	Research Presentations	<b>In class :</b> Discussion 13	6 people
15) Dec. 6	<b>FINAL EXAM</b>	<b>In class :</b> FINAL EXAM	
16) Dec. 12 by 5pm	FINAL WEEK (Monday Dec. 12 by 5pm)	<b>Due:</b> <u>Research Portfolio (final products uploaded in Box)</u>	

## References

- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4<sup>th</sup> ed.). Sage: Los Angeles.
- Fallon, L. M., Collier-Meek, M. A., Maggin, D. M., Sanetti, L. M., & Johnson, A. H. (2015). Is performance feedback for educators an evidence-based practice? A systematic review and evaluation based on single-case research. *Exceptional Children, 81*(2), 227-246.
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*(2), 165-179.
- McBride, D. M. (2016). *The process of research in psychology* (3<sup>rd</sup> ed.). Sage: Thousand Oaks, CA.
- Mertens, D. M. (2015). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (4<sup>th</sup> ed.). Sage: Los Angeles.
- Plavnick, J. B., & Ferreri, S. J. (2013). Single-case experimental designs in educational research: A methodology for causal analyses in teaching and learning. *Educational Psychology Review, 25*(4), 549-569.
- Smith, J. D. (2012). Single-case experimental designs: A systematic review of published research and current standards. *Psychological Methods, 17*(4), 510-531.